AVIAN EUTHANASIA

1. PURPOSE

1.1. The purpose of this Animal Care and Use Procedure (ACUP) is to describe the acceptable methods for euthanasia of avian species. This ACUP is intended for use by any personnel that will perform euthanasia on avian species. This ACUP is approved by the Cornell Institutional Animal Care and Use Committee (IACUC). Any deviation must be approved by the IACUC prior to its application.

2. SCOPE

2.1. This document applies to all avian users at Cornell University.

3. INTRODUCTION

3.1. The term euthanasia means "good death". Euthanasia techniques should result in rapid loss of consciousness followed by cardiac or respiratory arrest and the ultimate loss of brain function. In addition, the technique should minimize distress and anxiety experienced by the animal prior to loss of consciousness. This ACUP provides guidelines for the humane euthanasia of avian species using several techniques. Contact CARE at care@cornell.edu for more.

4. MATERIALS AND EQUIPMENT

4.1. Euthanasia Equipment and Support Supplies

4.1.1. Materials vary with euthanasia technique:

4.1.1.1. Injectable: Injectable agent, needles and syringes.
4.1.1.2. Inhalant: Inhalant agents, clear chamber, ± waste gas scavenger.

5. PROCEDURE

5.1. General Requirements
5.1.1. All individuals performing euthanasia must be appropriately qualified. Minimal required training is: Module 1, Module 2, and species specific training determined by CARE staff.

5.1.2. Adhere to IACUC-approved protocols and institutional policies.

5.1.3. Select the method of euthanasia based on the species, location, and objectives of the protocol.

5.1.4. Maintain equipment to ensure optimal performance.

5.1.5. Minimize distress to the animal, as well as to the operator, by handling the bird gently and carefully.

5.2. Non Physical Methods

5.2.1. Barbiturate overdose

5.2.1.1. Inject sodium pentobarbital, or commercially available euthanasia solution, for intravenous (IV) administration at a dose of 100-150 mg/kg.

**NOTE:** IV administration must be performed under sedation. When IV administration is not possible, the pentobarbital dose cited above can be injected via other routes (e.g., intracoelomic or intracardiac) so long as the bird is fully anesthetized (e.g., via isoflurane inhalation). Intracoelomic administration will result in delayed onset of action relative to IV or intracardiac administration.

**IMPORTANT:** Verify that an animal is dead before disposal of the body by confirming there is no respiratory movement for at least 3 minutes.

5.2.2. Overdose of inhalant anesthetic

5.2.2.1. Inhalant anesthetics (e.g., isoflurane and sevoflurane).

5.2.2.1.1. Expose the animal to a high gas concentration using an anesthetic vaporizer or chamber with pressure regulator.

5.2.2.1.2. Vapors are inhaled until respiration ceases and death ensues.

5.2.2.1.3. Vapor exposure should be maintained for at least 3 minutes after apparent clinical death.

**NOTE:** diving waterfowl are capable of holding their breath and anaerobic metabolism. Therefore, induction of anesthesia / unconsciousness is greatly prolonged. Inhalant methods of euthanasia in these species require a secondary method (i.e., physical) in order to assure euthanasia is achieved.

5.2.3. Carbon Dioxide (CO₂)

5.2.3.1. Use compressed CO₂ from gas cylinders; dry ice is not permitted as a CO₂ source.

5.2.3.2. Use the CO₂ in a chamber that is clear so that the bird can be observed.

5.2.3.3. Do not overcrowd the chamber or mix species within the chamber.
5.2.3.4. Do not pre-fill the chamber with CO₂. Once animals are placed in the chamber, set a flow rate that displaces ~10-30% of the chamber volume per minute.

5.2.3.5. Gas flow should be maintained for at least 3 minutes after apparent clinical death.

5.2.3.6. Sanitize the chamber after each session.

NOTE: Neonatal birds are tolerant of high concentrations of CO₂; therefore, a secondary means of euthanasia or prolonged exposure to high concentrations of CO₂ will be required to produce death (e.g., in excess of 20 minutes CO₂ exposure for chicks up to 72 hours old). For diving waterfowl, see notation in section 5.2.2.1.3.

5.3. Physical Methods

5.3.1. Personnel using physical methods of euthanasia must be appropriately trained:

5.3.1.1. Cervical dislocation

5.3.1.1.1. Acceptable for poultry and other birds less than 3 kg.

5.3.1.1.2. When feasible, a secondary method such as decapitation or exsanguination should be employed to ensure death.

5.3.1.2. Decapitation

5.3.1.2.1. Perform with dedicated and clean equipment that will ensure that the head is separated from the body rapidly and completely.

5.3.1.2.2. Refer to ACUP 309 Maintenance of Decapitation Equipment for proper compliance and care.

5.3.1.3. Gunshot

NOTE: All Cornell personnel wishing to use gunshot (e.g., firearms or air rifles) for euthanasia of vertebrates under an animal use protocol MUST be certified as proficient. Cornell personnel using firearms must also complete a safety training course. Proof of safety training and proficiency validation must be presented to the IACUC office and can be performed by an IACUC-designated person in Cornell’s Museum of Vertebrates, or Cornell’s Department of Natural Resources. Safety training can also be completed through a government sanctioned safety course.

5.3.1.3.1. Use of firearms and air rifles is limited to euthanasia of wild free-ranging birds and must be approved by Cornell’s IACUC and is further limited to areas where discharge of firearms is lawful and permission of landowner and all necessary state and federal permits have been obtained.

5.3.1.3.2. Exercise extreme caution so as to not cause personal injury.

5.3.1.3.3. Use species appropriate firearm or air rifle and ammunition.
5.3.1.3.4. The preferred target area is the head. The appropriate firearm should be selected for the situation, with the goal being penetration and destruction of brain tissue.

5.3.1.3.5. A gunshot to the heart or neck does not immediately render animals unconscious and therefore cannot be used as a means of euthanasia.

5.3.1.3.6. Refer to the 2013 edition of the American Veterinary Medical Association Guidelines for the Euthanasia of Animals for more details.

5.3.1.4. Other Physical Methods

5.3.1.4.1. Additional physical methods of euthanasia are acceptable as per the AVMA Guidelines for the Euthanasia of Animals. For more details, refer to these guidelines or contact a CARE veterinarian.

5.4. Embryos / Eggs / Hatchlings

5.4.1. Non-pipped eggs

5.4.1.1. For eggs that are less than 50% of the total incubation period, destroy the viability of the eggs prior to disposal (e.g., freezing, coating eggs with oil, carbon dioxide exposure, or maceration).

5.4.1.2. Bird embryos that have attained at least 50% incubation have developed a neural tube sufficient for pain perception; therefore they should be euthanized by similar methods used in avian neonates (see below). Eggs of unknown incubation time should be assumed to be at least 50% incubated.

5.4.2. Pipped eggs and hatchlings up to 72 hours old.

5.4.2.1. Any of the following are acceptable: anesthetic overdose, decapitation, or prolonged (i.e., at least 20 minutes) exposure to CO₂. Additionally, rapid maceration (via specially designed and well maintained equipment) is acceptable.

6. PERSONNEL SAFETY

6.1. Medical Emergencies: CALL 911.

6.2. When working with animals wear appropriate PPE, observe proper hygiene, and be aware of allergy, zoonosis, and injury risks. Refer to the CARE Occupational Health and Safety webpage for more information.

6.3. Firearms: Users MUST successfully complete a safety course before using firearms as a means of euthanasia.
7. ANIMAL RELATED CONTINGENCIES

7.1. Non-emergency veterinary questions and requests for care, email CARE veterinary staff at care@cornell.edu.

7.2. Emergency veterinary care is available at all times including after working hours and on weekends and holidays:

7.2.1. Biomedical Settings: CARE (pager 1-800-349-2456).

7.2.2. Farm Animal Settings:

7.2.2.1. Ambulatory and Production Medicine Service at (607) 253-3140,

7.2.2.2. Poultry: Cornell Animal Health Diagnostic Center Poultry Extension Veterinarian at (607) 253-4031.

8. REFERENCES


8.5. EH&S Research Use of Controlled Substances webpage: http://sp.ehs.cornell.edu/lab-research-safety/research-safety/controlled-substances/Pages/default.aspx


8.7. New York State Bureau of Narcotic Enforcement: http://www.health.state.ny.us/professionals/narcotic/


9. APPENDIX

9.1. Method of Euthanasia Chart

<table>
<thead>
<tr>
<th>Method of Euthanasia</th>
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<td>Barbiturates</td>
<td>Acceptable method</td>
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<tr>
<td>Inhalant Anesthetics</td>
<td>Acceptable with Conditions</td>
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<td>Carbon dioxide</td>
<td>NOTE: Neonates and diving</td>
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<td></td>
<td>birds will require prolonged</td>
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<td></td>
<td>exposure</td>
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<td>Cervical dislocation</td>
<td>For birds less than 3 kg.</td>
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<td>Staff must be trained and</td>
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<td>proficient.</td>
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<td>Decapitation</td>
<td>Requires scientific</td>
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<td>justification if done</td>
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<td>without anesthesia or</td>
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<td>sedation. For birds less</td>
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<td>than 3 kg with proper</td>
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<td>training and demonstrated</td>
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<td>technical proficiency</td>
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<td>Gunshot</td>
<td>Conditionally acceptable</td>
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<td>permits for free-range wild</td>
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<td>birds only</td>
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10. HISTORY

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